

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. § 371**

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U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

10/049273
Not yet assigned

INTERNATIONAL APPLICATION NO.

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

PCT/DE00/02611

August 4, 2000

August 10, 1999

TITLE OF INVENTION

SYSTEM AND METHOD FOR THE TRANSFER OF AN EXISTING LOGICAL DATA LINK (AS AMENDED)

APPLICANT(S) FOR DO/EO/US

Manfred HUBER et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

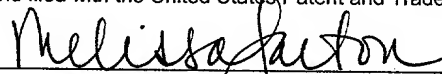
1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: 1) Application Data Sheet; 2) Int'l Search Report; 3) IPER; 4) Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on February 11, 2002.


Melissa Garton

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

Not yet assigned

10/04973

INTERNATIONAL APPLICATION

PCT/DE00/02611

ATTORNEY DOCKET NO.

449122021100

21. ☒ The following fees are submitted:

CALCULATIONS
PTO USE ONLY

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO.....\$1,000.00

International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO.....\$890.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
but all claims did not satisfy provision of PCT Article 33(1)-(4)\$690.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO
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ENTER APPROPRIATE BASIC FEE AMOUNT = \$890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from
the earliest claimed priority date (37 CFR 1.492(e)). \$0

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	- 20 =		x \$18.00	\$0
Independent claims	- 3 =		x \$80.00	\$0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	\$0
TOTAL OF ABOVE CALCULATIONS =				\$890.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0
SUBTOTAL =				\$890.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$0
TOTAL NATIONAL FEE =				\$890.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$40.00
TOTAL FEES ENCLOSED =				\$930.00
				Amount to be refunded: \$
				charged: \$

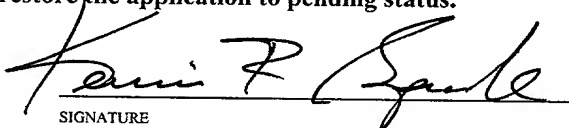
a. ☒ Please charge my **Deposit Account No. 03-1952** (referencing Docket No. 449122021100) in the amount of \$930.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952** (referencing Docket No. 449122021100).

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

Kevin R. Spivak
Registration No. 43,148

February 11, 2002

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on February 11, 2002.


Melissa Garzon

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Manfred HUBER *et al.*

Serial No.: Not yet assigned

Examiner: Not yet assigned

Filing Date: February 11, 2002

Group Art Unit: Not yet assigned

For: SYSTEM AND METHOD FOR
THE TRANSFER OF AN
EXISTING LOGICAL DATA
LINK (AS AMENDED)

PRELIMINARY AMENDMENT

BOX PCT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Specification:

Page 1 before the first paragraph, please delete the following:

Description

The title has been amended as follows:

**SYSTEM AND METHOD FOR THE TRANSFER OF
AN EXISTING LOGICAL DATA LINK**

Page 1, between lines 4 and 5, please insert the following headings and paragraph:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/002611 which was published in the German language on August 4, 2000.

TECHNICAL FIELD OF THE INVENTION

Please replace the paragraph beginning at line 6 of page 1 with the following rewritten paragraph:

The invention relates to a method for the transfer of an existing logical data link, and in particular, to a logical data link existing between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network.

Page 1, before 12, please insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 12 of page 1 with the following rewritten paragraphs:

A telecommunications network of this type is illustrated by way of example in Figure 1. In Figure 1, the telecommunications network is connected to an access computer AP of a data network DN, e.g. the Internet. Various subscriber terminals, e.g. a personal computer PC, a corded telephone TF and a cordless handset SL with its base station BS, are connected to a switching center VST. The switching center has a connection to the access computer AP of the data network DN via a circuit-switched public telephone network PSTN or via a packet-switched data network PN, e.g. X.25. At the same time, the public telephone network is connected to a mobile communications network PLMN which encompasses a plurality of radio devices RBS for connecting a plurality of subscriber terminals via a radio interface. Such subscriber terminals are, for example, mobile stations MS. It is also possible for a laptop LT or a personal computer to be connected to one of the indicated mobile stations via a serial interface, or for a mobile station to be integrated in a laptop or personal computer.

Given a network constellation of this type, the situation is currently as follows: A subscriber of the telecommunications network has various subscriber terminals, for example as illustrated in Figure 1, which enable access to a data network, e.g. the Internet. Accordingly, with

his subscriber terminal having display screen, e.g. TF, the subscriber can receive, read and process electronic mail (email) from the data network. It is assumed that the subscriber has established a data link to the data network with such a subscriber terminal in order to send his electronic mail from a so-called mail server, (not shown in figure 1) of the data network to his subscriber terminal. However, large items of electronic mail received which contain, for example, attachments in the format of PC applications (e.g. Word) cannot be displayed on the subscriber terminal, e.g. TF, because of the relatively small display and the low memory capacity. The subscriber therefore would like to use his personal computer to read such electronic mail. Hence, the subscriber must either establish a further data link (e.g. by using the second B-channel in the case of an ISDN connection) or a new data link to the access computer of the data network. Authorization must be obtained again, by typing in a password for example, the respective PC application must be activated for reading electronic mail on his PC, and the appropriate electronic mail with the attachment for displaying on the screen of the personal computer must be selected. If the subscriber then switches off the personal computer again and would like to continue processing further electronic mail on his telephone with display, he must repeat the procedure set out above.

Also, in the case of Internet applications other than electronic mail, such as the accessing of provider pages with the aid of a so-called browser for example, the subscriber must proceed in a similar manner to reach the same state on his personal computer as was previously present on his telephone. That is, for example the same provider page accessed, the same state of transactions already made, such as a file transfer for example, the same bookmarks etc.

A procedure of this type is disadvantageous for at least the following reasons:

- The establishment of a further or a new data link requires renewed authorization of the user, for example by entering passwords, and the selection of the access computer to be dialed.
- The renewed connection establishment is in itself time-consuming since it is necessary to assign a new data network address (IP address) to the subscriber terminal (the personal computer in the example) for an Internet session, for which the so-called PPP (point-to-point) protocol is preferably used. Moreover, the communication partners of the data link must agree on transmission parameters, such as transmission bandwidth and quality for example, and also exchange authorization data again.

Please delete the paragraph beginning on Page 3, line 21 in its entirety.

Please delete the paragraph beginning on Page 3, line 23 in its entirety.

Page 3, before line 26, please insert the following headings and paragraphs:

SUMMARY OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 26 of page 3 with the following rewritten paragraphs:

In one embodiment of the invention, there is a method for the transfer of an existing logical data link between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network from the first subscriber terminal to a second subscriber terminal which is connected to the subscriber line of the first subscriber terminal or to another subscriber line of the telecommunications network. The first subscriber terminal sends a message concerning the communication state of the existing logical data link to the second subscriber terminal and takes over the data link in the reported communication state, adapting its own state. The communication state refers to agreements between the communication partners of the logical data link that have already been "negotiated" during connection establishment or in the course of the data link. The communication state also refers to states relating to activated applications and device settings of the first subscriber terminal.

The message concerning the communication state may include, for example, the assigned data network address of the first subscriber terminal and/or information about the transmission bandwidth and/or information about a reserved quality and/or authorization information and/or application settings information and/or information about the state of the applications activated in the first subscriber terminal and/or synchronization information for one or more data communication devices present in the subscriber terminal. The second subscriber terminal adapts its own state to the communication state. It thus takes the place of the first subscriber terminal. In addition, it sets its applications in accordance with the application settings of the first subscriber terminal, such as address books or bookmarks on Internet pages for example, and at the same

time activates the applications that correspond to the applications of the first subscriber terminal. If, for example, an Internet browser or a word processing program is activated on the first subscriber terminal, then an Internet browser or a corresponding word processing program, e.g. Word, is therefore likewise launched on the second subscriber terminal.

In connection with the situation illustrated above, in which a subscriber has a first subscriber terminal, in the form of a telephone with display for example, and a second subscriber terminal, e.g. a PC, on his subscriber line, the method according to the invention represents a particularly favorable solution. For reading large items of electronic mail the subscriber can transfer the logical data link to his personal computer. The respective electronic mail which the subscriber had previously selected on the telephone is immediately displayed on the screen of the personal computer using a corresponding application. No interactions are required on the part of the subscriber. Transmission properties of the data link, such as transmission bandwidth or a reserved quality for example, are also retained. Settings in applications in the second subscriber terminal, such as address books for example, are also synchronized with those of the first subscriber terminal. The same advantages are conferred if the subscriber wishes to transfer back the transferred logical data link from the second subscriber terminal to the first subscriber terminal again.

In another embodiment of the invention, the method is applied to the case where the first subscriber terminal and the second subscriber terminal are connected to different subscriber lines. For example, if the telephone of the subscriber is installed in the house and the personal computer is installed in the office of the subscriber. It is therefore possible to transfer an existing logical data link between the subscriber terminal at home and the access computer of the data network to the personal computer of a trusted colleague in the office.

In one aspect of the invention, the telecommunications network comprises at least one fixed network and/or at least one mobile network. Accordingly, a logical data link that exists between a mobile station of the mobile network and the data network can be transferred to a second subscriber terminal, e.g. a personal computer, which is connected to a subscriber line of the fixed network, and vice versa. A personal computer can also be connected directly to the mobile station and can take over the existing data link. The method according to the invention can therefore be used on different types of network.

Another aspect of the invention relates to message exchange between the first subscriber terminal and the second subscriber terminal, which both belong to a digital, preferably an ISDN, subscriber line. Messages are exchanged in such a way that one of the subscriber terminals (T1,T2) sends a message addressed to the other terminal to the network termination of the subscriber line, and the latter passes said message both back in the direction of the other subscriber terminal and forward in the direction of the switching center, which on receiving said message either ignores or processes it. For this purpose the signaling protocol need only be modified slightly so that the switching center can ignore or evaluate the message received.

In still another aspect of the invention, the logical data link is transferred from a first analog subscriber terminal to a second analog subscriber terminal which is connected to the analog subscriber line of the first subscriber terminal, and when the logical data link is taken over the connection previously established by the first subscriber terminal between the subscriber line and the aforesaid switching center of the telecommunications network is maintained. By dispensing with a new establishment of a connection between the subscriber line and the switching center which is necessary for transferring the existing logical data link, above all resources in the network and time are saved, and repeated interactions of the subscriber, for example through repeated typing in of his password, are avoided.

Yet another aspect of the invention includes that after transmission of the message concerning the communication state, a suspension of data transmission on the data link is initiated by the first subscriber terminal and once the logical data link has been taken over the resumption of data transmission is initiated by the second subscriber terminal. This minimizes the loss of data which would normally lead to a repeated transmission of the lost data, resulting in reduced transmission bandwidth.

To avoid new establishment of the connection between the switching center and the subscriber line, according to another aspect of the invention, the logical link is maintained during the aforesaid suspension phase.

Page 7, between lines 23 and 24, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the paragraph beginning line 24 of page 7 with the following rewritten paragraph:

An exemplary embodiment of the invention is explained below in greater detail with reference to a drawing, in which:

Figure 1 shows an exemplary network constellation to which the method according to the invention can be applied.

Figure 2 shows a flow diagram of the method according to the invention in which two subscriber terminals are connected to the S0 bus of an ISDN subscriber line.

Figure 3 shows a flow diagram of the method according to the invention in which the subscriber terminals are connected in parallel to an a/b line of an analog subscriber line.

Figure 4 shows a flow diagram in which the subscriber terminals are connected in series to an a/b line of an analog subscriber line.

Figure 5 shows a flow diagram in which the first subscriber terminal represents a mobile station of the mobile network and the second subscriber terminal belongs to an ISDN or analog subscriber line of the fixed network.

Page 8, between lines 9 and 10, please insert the following heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace the consecutive paragraphs beginning at line 10 of page 8 with the following rewritten paragraphs:

Figure 2 represents an ISDN subscriber line in which the subscriber terminals, e.g. T1 and T2, are connected in parallel to a so-called S0 bus which terminates at the network termination NT schematically indicated in the figure. From the network termination NT, a subscriber line leads to the switching center VST of the public telephone network. The switching center has a connection to an access computer AP of a data network. The connection may be of various different types and is therefore indicated by a broken line in Figure 2. For example, as described in Figure 1, the connection may be established to the access computer AP via the public telephone network PSTN or via the No. 7 signaling network of the public telephone network, or via a packet-switched network, e.g. X.25. The access computer AP may also be integrated in the switching center VST. Various types of terminals are possible as subscriber terminals T1 and T2, e.g. a personal computer, a corded telephone with a display, or also a base station with a radio link to a cordless telephone.

In the example that follows, a subscriber has established a connection to the access computer of the data network with his subscriber terminal T1, e.g. a telephone with display. After retrieving his new electronic mail that has arrived at a mail server, he would like to read it and he notices that some electronic mail messages are very large. He would like to transfer this logical data link to his personal computer, e.g. T2. For this he presses a key on his telephone for example. The subscriber terminal T1, i.e. the telephone, then sends a request message Request for transferring the logical data link including its communication state Context to the subscriber terminal T2.

The message can be transmitted using ISDN signaling. The signaling message, i.e. the request message Request, is sent to the network termination NT, which represents the interface to the S0 bus. The message is then sent back to the subscriber terminal T2 and forwarded to the switching center VST. The switching center can either accept this message as a so-called suspend message Suspend or simply ignore it. Said message Suspend can, as shown in the figure, be forwarded by the switching center to the access computer AP in order to signal the access computer to suspend data transmission on the logical data link but continue to maintain the data link. This suspended state of the access computer is indicated in Figure 2 by Hold.

Please replace the consecutive paragraphs beginning at line 29 of page 9 with the following rewritten paragraphs:

Finally the subscriber terminal T2 establishes a new connection, indicated by "Connection" in Figure 2, to the access computer. In doing so, in accordance with the communication state received, the subscriber terminal T2 sets the same device state as the subscriber terminal T1 had prior to transmission of the request message, and also the same connection state with respect to the data link that the connection between the subscriber terminal T1 and the access computer had prior to transmission of the request message. In other words, the subscriber terminal T2 assumes the agreements that the subscriber terminal T1 and the access computer AP had already "negotiated" during connection establishment. For example, if the so-called PPP protocol was used, a data network address, e.g. an IP address, was assigned to the subscriber terminal T1 when a connection was established from the access computer. The data network address is now assumed by the subscriber terminal T2. Using the information on the communication state received, the subscriber terminal T2 can also set the transmission

bandwidth as well as a previously reserved quality, for example using the RSVP protocol commonly used on the Internet. Since the subscriber terminal T2 receives authorization information in the message concerning the communication state of the subscriber terminal T1, the subscriber is spared a new authorization procedure, for example through typing in passwords.

The subscriber terminal T2 furthermore automatically launches corresponding applications, e.g. an Internet browser or software for reading and processing electronic mail, and performs settings in accordance with the communication state reported to it. In the case where the subscriber would like to read large electronic mail items, corresponding "electronic mail" software is activated on the subscriber terminal T2, i.e. the personal computer, and the desired electronic mail is immediately selected and displayed on the screen with the aid of a suitable editor. An appropriate PC application, e.g. "Word", is immediately activated for any attachments also sent. In the case of an Internet session using a browser, a corresponding browser is launched on the personal computer and the corresponding Internet page is activated, and corresponding transactions (e.g. file transfer) are performed. Once the subscriber terminal T2 has adapted itself in accordance with the reported communication state, it sends a message Completed to the subscriber terminal T1 with which it confirms that the connection establishment and appropriate adapting of its own state to the reported communication state have been successfully performed.

The subscriber terminal T1 then sends a message Release via the switching center in the direction of the access computer to terminate the existing connection. The subscriber terminal T1 signals the connection cleardown to the subscriber terminal T2 with a message Link terminated. Following this the subscriber terminal T2 can initiate resumption of data transmission with a message Resume to the access computer. After a defined period, the existing connection between the subscriber terminal T1 and the access computer AP can be cleared, once the subscriber terminal T1 has received the message Completed.

Please replace the consecutive paragraphs beginning at line 14 of page 12 with the following rewritten paragraphs:

With the MPPP protocol, the newly established connection between the subscriber terminal T2 and the access computer AP is combined with the existing connection between the subscriber terminal T1 and the access computer AP to form a so-called "multilink bundle". At the subscriber end one channel of the multilink bundle now terminates in the subscriber terminal

T1, and the other channel in the subscriber terminal T2. To ensure unambiguous addressing of the connected subscriber terminals, the subscriber terminal T1 sends a "HandOverCompleted" message, not shown in the figure, to the subscriber terminal T2 once establishment of the new connection to the subscriber terminal T2 and adaptation of the communication state have been successfully completed. Following this, the subscriber terminal T1 clears its existing connection and sends a message Link terminated to the subscriber terminal T2.

Figure 3 describes the method according to the invention for an analog subscriber line in which the subscriber terminals T1 and T2 are connected in parallel to the switching center VST via a so-called a/b connection. Initially there is a connection between the subscriber terminal T1 and the access computer AP. The subscriber terminal T1 signals the switching center VST to suspend data transmission with a message Suspend, which is forwarded to the access computer AP and puts the latter into the aforesaid Hold state. The message Suspend may be transmitted, for example, by means of DMTF (Dual Tone Multifrequency) tones or MFC (Multifrequency Code). After receiving the message Suspend, the switching center suspends the data transmission between the access computer and the subscriber terminal T1 on the physical layer. In the Hold state, the access computer maintains the logical link, even if physically no data can be exchanged between the access computer and the subscriber terminal T1. Data can then be sent between the subscriber terminals T1 and T2. While data transmission is suspended, the switching center monitors the subscriber line connected to the network termination for the arrival of a message Resume.

After suspension of data transmission, the subscriber terminal T1 sends a message Context concerning the communication state of the existing logical link to the subscriber terminal T2. The message can be transmitted for example using FSK (Frequency Shift Keying). The subscriber terminal T2 adapts its own state – as already described above – to the reported communication state. If necessary, resynchronization must be performed for the subscriber-side and network-side data communication equipment, e.g. modems, participating in the data link.

In contrast to the method described for an ISDN subscriber line, the subscriber terminal T2 assumes the switched connection to the access computer AP. It is therefore unnecessary to physically establish a connection or establish a new connection. By sending a message Resume to the access computer, the subscriber terminal T2 then initiates resumption of data transmission. The connection is transferred in that the subscriber terminal T2 picks up the connection and the

subscriber terminal T1 hangs up. Once the described transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the access computer AP via the switching center VST.

Please replace the consecutive paragraphs beginning at line 18 of page 14 with the following rewritten paragraphs:

In the first case, a connection initially exists between the subscriber terminal T1 and the access computer AP. The subscriber terminal T1 sends a message Suspend to the access computer, whereby the latter is put in the Hold state. The subscriber terminal T1 then passes a message Context concerning the communication state to the subscriber terminal T2. Following this the subscriber terminal T2 adapts its own state to the communication state and assumes the switched connection, in that it picks up the connection and the subscriber terminal T1 hangs up. A resynchronization of the subscriber-side or network-side data communication equipment, e.g. modems, may be necessary. Following this the subscriber terminal T2 transmits the message Resume to the access computer to initiate the resumption of data transmission. Once the transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the access computer AP via the switching center VST.

According to a variation of the method described above, it is possible here to omit the sending of the message Suspend, the suspension of data transmission and the Hold state of the access computer AP to maintain the logical data link. Since the subscriber terminals T1 and T2 are directly connected to one another, they can also communicate directly with one another. That is, the subscriber terminal T1 need only "hang up" and the subscriber terminal T2 "picks up" once it has adapted its state to the reported communication state.

The method for transferring the existing logical data link from the subscriber terminal T2 to the subscriber terminal T1 according to the second case mentioned is analogous to the method described with reference to Figure 3. To transfer the data link, the subscriber terminal T1 picks up the existing connection to the access computer and the subscriber terminal T2 hangs up.

Figure 5 shows the case where the telecommunications network comprises a fixed network and a mobile network. In this case the subscriber terminal T2 of an ISDN or analog subscriber line is connected to the switching center VST, which has a connection to the access computer AP of the data network. In addition, the switching center VST, as illustrated in

Figure 1, is connected via the telephone network and a mobile network to a radio device RBS that has a radio link to the subscriber terminal T1, e.g. a mobile station. The broken lines shown in figure 5 indicate connections between the network elements VST, AP and RBS, for example according to those illustrated in Figure 1.

Initially a connection exists, for example, between the subscriber terminal T1 and the access computer AP. The same signaling messages are then exchanged as described with reference to the other figures. That is, the subscriber terminal T1 sends a message Suspend to the access computer AP, which puts the latter into the suspended state Hold. The subscriber terminal T1 then sends a request message Request including the communication state Context to transfer the existing logical data link to the subscriber terminal T2. Once the access computer has received the message Resume from the subscriber terminal T2, it resumes data transmission. The method described can also be used for transferring the existing data link to the access computer from the subscriber terminal T2 to the mobile station T1. The difference from the methods described in Figures 2 to 4 is essentially that the signaling messages, e.g. Request, are transported over the entire telecommunications network.

According to another variation of the described procedure, a laptop, for example, is connected via a serial interface to the mobile station T1 shown in Figure 5. The previously existing connection between the mobile station T1 and the access computer AP is thus passed on to the laptop. This method ultimately corresponds to the sequence illustrated in Figure 4. The subscriber terminal T1 in Figure 4 should be thought of as a mobile station and the subscriber terminal T2 as a laptop.

It applies to the methods described above that, once completed, the transferred logical data link to the subscriber terminal T2 can be transferred back to the subscriber terminal T1 again in the same way.

The method according to the invention has a further application in the case where a so-called always-on connection exists between a subscriber terminal, e.g. T1, and the access computer AP. An always-on connection means a permanent narrowband data link from the subscriber terminal to the access computer AP. For ISDN subscriber lines such a narrowband connection is made available through the provision of a certain amount of bandwidth on the D-channel. With an analog subscriber line, the so-called on-hook data transmission method in

accordance with the ETS 300 659-1 standard can be utilized for a permanent connection of this type.

Returning to Figure 2, it should be imagined that a subscriber terminal T1 has such a permanent connection to the access computer AP. The subscriber terminal, e.g. a telephone with display, receives electronic mail over this permanent connection. The subscriber would then like to read the electronic mail on his personal computer T2 for example. The method for transferring the existing logical data link between the subscriber terminal T1 and the access computer AP then proceeds in the same way as described in Figure 2. To take over the existing data link, a new connection is switched between the subscriber terminal T2 and the access computer AP. Once connection establishment and adaptation of its own state to the reported communication state have been successfully completed, however, the existing permanent narrowband connection between the subscriber terminal T1 and the access computer AP is not cleared. The access computer need only be notified that all data will be sent to the subscriber terminal T2 for as long as the connection to the subscriber terminal T2 exists. On termination of the connection with the subscriber terminal T2, the data are again transmitted to the subscriber terminal T1 over the permanent connection.

In the Claims:

Please amend the claims as follows:

What is claimed is:

1. (Amended) A method for the transfer of an existing logical data link between a first subscriber terminal and a second subscriber terminal in a telecommunications network, comprising:

connecting the first subscriber terminal to a subscriber line of the telecommunications network, and connecting a switching center of the telecommunications network from the first subscriber terminal to the second subscriber terminal, the second subscriber terminal connected to the subscriber line of the first subscriber terminal or to another subscriber line of the telecommunications network;

receiving a message at the second subscriber terminal sent from the first subscriber terminal and providing the communication state of an existing logical data link and assuming the logical data link in the communication state.

2. (Amended) The method as claimed in claim 1, wherein the telecommunications network comprises at least one fixed network and/or at least one mobile network.
3. (Amended) The method as claimed in claim 1, further comprising:
exchanging messages between the first subscriber terminal and the second subscriber terminal each belonging to a digital subscriber line, such that one of the subscriber terminals sends a message addressed to the other terminal to a network termination of the subscriber line, and the other terminal sends the message to the other subscriber terminal and to a switching center.
4. (Amended) The method as claimed in claim 1, further comprising:
transferring the logical data link from a first analog subscriber terminal to a second analog subscriber terminal which is connected to the analog subscriber line of the first subscriber terminal and, when the logical data link is assumed by the second subscriber terminal, the connection previously established by the first subscriber terminal between the subscriber line and the switching center is maintained.
5. (Amended) The method as claimed in claim 1, wherein after transmission of the message of the communication state, a suspension of data transmission on the logical data link is initiated by the first subscriber terminal and, after the logical data link has been transferred, data transmission is resumed and is initiated by the second subscriber terminal.
6. (Amended) The method as claimed in claim 5, wherein the logical link between the switching center and the subscriber terminal is maintained during the suspension phase.
7. (Amended) The method as claimed in claim 1, wherein the message about the communication state includes an assigned data network address of at least one of the first

subscriber terminal, information about transmission bandwidth, information about a reserved quality, authorization information, application settings information, information about a state of applications activated in the first subscriber terminal and synchronization information for one or more data communication devices present in the subscriber terminal.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

2017-01-01 10:00:00

REMARKS

The above amendments to the specification, claims, and abstract have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

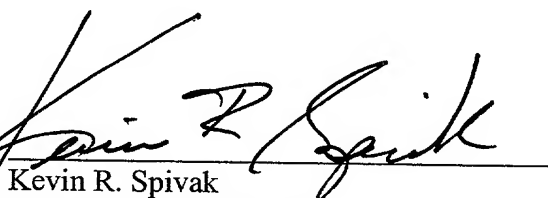
Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made".

In the event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 449122021100. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: February 11, 2002

By:


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Specification:

Page 1 before the first paragraph, please delete the following:

~~Description~~

The title has been amended as follows:

**SYSTEM AND METHOD FOR THE TRANSFER OF
AN EXISTING LOGICAL DATA LINK**

Page 1, between lines 4 and 5, please insert the following headings and paragraph:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/002611 which was published in the German language on August 4, 2000.

TECHNICAL FIELD OF THE INVENTION

Please replace the paragraph beginning at line 6 of page 1 with the following rewritten paragraph:

The invention relates to a method for the transfer of an existing logical data link. ~~The, and in particular, to a logical data link exists~~ existing between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network.

Page 1, before 12, please insert the following heading:

BACKGROUND OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 12 of page 1 with the following rewritten paragraphs:

A telecommunications network of this type is illustrated by way of example in ~~Figure~~ 1. In ~~it~~ Figure 1, the telecommunications network is connected to an access computer AP of a data network DN, e.g. the Internet. Various subscriber terminals, e.g. a personal computer PC, a corded telephone TF and a cordless handset SL with its base station BS, are connected to a switching center VST. ~~Said~~ The switching center has a connection to the ~~aforesaid~~ access computer AP of the data network DN via a circuit-switched public telephone network PSTN or via a packet-switched data network PN, e.g. X.25. At the same time, the public telephone network is connected to a mobile communications network PLMN which encompasses a plurality of radio devices RBS for connecting a plurality of subscriber terminals via a radio interface. Such subscriber terminals are, for example, mobile stations MS; ~~it~~. It is also possible for a laptop LT or a personal computer to be connected to one of the indicated mobile stations via a serial interface, or for a mobile station to be integrated in a laptop or personal computer.

Given a network constellation of this type, the situation is currently as follows: A subscriber of the telecommunications network has various subscriber terminals, for example as illustrated in ~~Figure~~ 1, which ~~all~~ enable access to a data network, e.g. the Internet. Accordingly, with his subscriber terminal ~~with~~ having display screen, e.g. TF, the subscriber can receive, read and process electronic mail (email) from the data network. It is assumed that the subscriber has established a data link to the data network with such a subscriber terminal in order to send his electronic mail from a so-called mail server, (not shown in figure 1;) of the data network to his subscriber terminal. However, large items of electronic mail received which contain, for example, so-called attachments in the format of PC applications (e.g. Word) cannot be displayed on the subscriber terminal, e.g. TF, because of the relatively small display and the low memory capacity. The subscriber therefore would like to use his personal computer to read such electronic mail. ~~For this~~ Hence, the subscriber must either establish a further data link (e.g. by using the second B-channel in the case of an ISDN connection) or a new data link to the access computer of the data network, ~~must obtain a~~ Authorization must be obtained again, by typing in a password for example, ~~must activate~~ the respective PC application must be activated for reading electronic mail on his PC, and ~~finally must select the aforesaid~~ the appropriate electronic mail with the attachment for displaying on the screen of the personal computer must be selected. If the subscriber then switches off the personal computer ~~again~~ and would like to continue

processing further electronic mail on his telephone with display, he must repeat the procedure set out above.

Also, in the case of Internet applications other than electronic mail, such as the accessing of provider pages with the aid of a so-called browser for example, the subscriber must proceed in a similar manner to reach the same state on his personal computer as was previously present on his telephone, ~~that~~. That is, to say for example the same provider page accessed, the same state of transactions already made, such as a file transfer for example, the same bookmarks etc.

A procedure of this type is disadvantageous for ~~a number of~~ at least the following reasons:

- The establishment of a further or a new data link requires renewed authorization of the user, for example by entering passwords, and the selection of the access computer to be dialed.
- The renewed connection establishment is in itself time-consuming since it is necessary to assign a new data network address (IP address) to the subscriber terminal (the personal computer in the example) for an Internet session, for which the so-called PPP (point-to-point) protocol is preferably used. Moreover, the communication partners of the data link must ~~again~~ agree on transmission parameters, such as transmission bandwidth and quality for example, and ~~must~~ also exchange authorization data again.

Please delete the paragraph beginning on Page 3, line 21 in its entirety.

Please delete the paragraph beginning on Page 3, line 23 in its entirety.

Page 3, before line 26, please insert the following headings and paragraphs:

SUMMARY OF THE INVENTION

Please replace the consecutive paragraphs beginning at line 26 of page 3 with the following rewritten paragraphs:

~~The basis of~~ In one embodiment of the invention, there is a method for the transfer of an existing logical data link between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network from the

first subscriber terminal to a second subscriber terminal which is connected to the subscriber line of the first subscriber terminal or to another subscriber line of the telecommunications network. The first subscriber terminal sends a message concerning the communication state of the existing logical data link to the second subscriber terminal and takes over the data link in the reported communication state, adapting its own state. The communication state refers to all agreements between the communication partners of the logical data link that have already been "negotiated" during connection establishment or in the course of the data link. The communication state also refers to states relating to activated applications and device settings of the first subscriber terminal.

The message concerning the communication state ~~can contain in particular:~~ may include, for example, the assigned data network address of the first subscriber terminal and/or information about the transmission bandwidth and/or information about a reserved quality and/or authorization information and/or application settings information and/or information about the state of the applications activated in the first subscriber terminal and/or synchronization information for one or more data communication devices present in the subscriber terminal. The second subscriber terminal adapts its own state to the communication state. It thus takes the place of the first subscriber terminal. In addition, it sets its applications in accordance with the application settings of the first subscriber terminal, such as address books or bookmarks on Internet pages for example, and at the same time activates the applications that correspond to the applications of the first subscriber terminal. If, for example, an Internet browser or a word processing program is activated on the first subscriber terminal, then an Internet browser or a corresponding word processing program, e.g. Word, is therefore likewise launched on the second subscriber terminal.

~~In particular in~~ In connection with the situation illustrated ~~above-at the outset~~, in which a subscriber has a first subscriber terminal, in the form of a telephone with display for example, and a second subscriber terminal, e.g. a PC, on his subscriber line, the method according to the invention represents a particularly favorable solution. For reading large items of electronic mail the subscriber can transfer the logical data link to his personal computer. The respective electronic mail which the subscriber had previously selected on the telephone is immediately displayed on the screen of the personal computer using a corresponding application. No interactions are required on the part of the subscriber. Transmission properties of the data link,

such as transmission bandwidth or a reserved quality for example, are also retained. Settings in applications in the second subscriber terminal, such as address books for example, are also synchronized with those of the first subscriber terminal. The same advantages are conferred if the subscriber wishes to transfer back the transferred logical data link from the second subscriber terminal to the first subscriber terminal again.

~~The method according to~~ In another embodiment of the invention, the method is ~~can~~ likewise be advantageously applied to the case where the first subscriber terminal and the second subscriber terminal are connected to different subscriber lines; ~~that is to say if, for example,~~ For example, if the aforesaid telephone of the subscriber is installed in the house and the personal computer is installed in the office of the subscriber. It is therefore possible to transfer an existing logical data link between the subscriber terminal at home and the access computer of the data network to the personal computer of a trusted colleague in the office.

In one aspect ~~One refinement~~ of the invention, ~~relates to the aforesaid~~ telecommunications network, ~~which~~ comprises at least one fixed network and/or at least one mobile network. Accordingly, a logical data link that exists between a mobile station of the mobile network and the data network can be transferred to a second subscriber terminal, e.g. a personal computer, which is connected to a subscriber line of the fixed network, and vice versa. A personal computer can also be connected directly to the mobile station and can take over the existing data link. The method according to the invention can therefore be used on different types of network.

Another aspect ~~A further refinement~~ of the invention relates to message exchange between the first subscriber terminal and the second subscriber terminal, which both belong to a digital, preferably an ISDN, subscriber line. Messages are exchanged in such a way that one of the subscriber terminals (T1,T2) sends a message addressed to the other terminal to the network termination of the subscriber line, and the latter passes said message both back in the direction of the other subscriber terminal and forward in the direction of the switching center, which on receiving said message either ignores or processes it. For this purpose the signaling protocol need only be modified slightly so that the switching center can ignore or evaluate the message received.

In still another aspect ~~One further development~~ of the invention, ~~envisages that the~~ logical data link is transferred from a first analog subscriber terminal to a second analog

subscriber terminal which is connected to the analog subscriber line of the first subscriber terminal, and when the logical data link is taken over the connection previously established by the first subscriber terminal between the subscriber line and the aforesaid switching center of the telecommunications network is maintained. By dispensing with a new establishment of a connection between the subscriber line and the switching center which is necessary for transferring the existing logical data link, above all resources in the network and time are saved, and repeated interactions of the subscriber, for example through repeated typing in of his password, are avoided.

~~A further advantageous refinement~~ Yet another aspect of the invention ~~consists in that, at the latest~~ includes that after transmission of the message concerning the communication state, a suspension of data transmission on the data link is initiated by the first subscriber terminal and once the logical data link has been taken over the resumption of data transmission is initiated by the second subscriber terminal. This minimizes the loss of data which would normally lead to a repeated transmission of the lost data, resulting in reduced transmission bandwidth.

To avoid new establishment of the connection between the switching center and the subscriber line, according to ~~a further development~~ another aspect of the invention, the logical link is maintained during the aforesaid suspension phase.

Page 7, between lines 23 and 24, please insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Please replace the paragraph beginning line 24 of page 7 with the following rewritten paragraph:

An exemplary embodiment of the invention is explained below in greater detail with reference to a drawing, in which:

Figure 1 shows the an exemplary network constellation ~~mentioned at the outset~~ to which the method according to the invention can be applied;

Figure 2 shows a flow diagram of the method according to the invention in which two subscriber terminals are connected to the S0 bus of an ISDN subscriber line;

Figure 3 shows a flow diagram of the method according to the invention in which the subscriber terminals are connected in parallel to an a/b line of an analog subscriber line;

Figure 4 shows a flow diagram in which the subscriber terminals are connected in series to an a/b line of an analog subscriber line; and.

Figure 5 shows a flow diagram in which the first subscriber terminal represents a mobile station of the mobile network and the second subscriber terminal belongs to an ISDN or analog subscriber line of the fixed network.

Page 8, between lines 9 and 10, please insert the following heading:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace the consecutive paragraphs beginning at line 10 of page 8 with the following rewritten paragraphs:

Figure 2 represents an ISDN subscriber line in which the subscriber terminals, e.g. T1 and T2, are connected in parallel to a so-called S0 bus which terminates at the network termination NT schematically indicated in the figure. From the network termination NT, a subscriber line leads to the switching center VST of the public telephone network. The switching center has a connection to an access computer AP of a data network. ~~Said~~The connection may be of various different types and is therefore indicated by a broken line in ~~f~~Figure 2. For example, as described in ~~f~~Figure 1, the connection may be established to the access computer AP via the public telephone network PSTN or via the No. 7 signaling network of the public telephone network, or via a packet-switched network, e.g. X.25. The access computer AP may also be integrated in the switching center VST. Various types of terminals are possible as subscriber terminals T1 and T2, e.g. a personal computer, a corded telephone with a display, or also a base station with a radio link to a cordless telephone.

In the example that follows, a subscriber has established a connection to the access computer of the data network with his subscriber terminal T1, e.g. a telephone with display. After retrieving his new electronic mail that has arrived at a mail server, he would like to read it and he notices that some electronic mail messages are very large. He would like to transfer this logical data link to his personal computer, e.g. T2. For this he presses a key on his telephone for example. The subscriber terminal T1, i.e. the telephone, then sends a request message Request for transferring the logical data link including its communication state Context to the subscriber terminal T2.

The message can be transmitted using ISDN signaling. The signaling message, i.e. the request message Request, is sent to the network termination NT, which represents the interface to the S0 bus. The message is then ~~both~~ sent back to the subscriber terminal T2 and forwarded to the switching center VST. The switching center can either accept this message as a so-called suspend message Suspend or simply ignore it. Said message Suspend can, as shown in the figure, be forwarded by the switching center to the access computer AP in order to signal the access computer to suspend data transmission on the logical data link but continue to maintain the data link. This suspended state of the access computer is indicated in ~~f~~Figure 2 by Hold.

Please replace the consecutive paragraphs beginning at line 29 of page 9 with the following rewritten paragraphs:

Finally the subscriber terminal T2 establishes a new connection, indicated by "Connection" in ~~f~~Figure 2, to the access computer. In doing so, in accordance with the communication state received, the subscriber terminal T2 sets the same device state as the subscriber terminal T1 had prior to transmission of the request message, and also the same connection state with respect to the data link that the connection between the subscriber terminal T1 and the access computer had prior to transmission of the request message. In other words, the subscriber terminal T2 ~~must take over~~ assumes the agreements that the subscriber terminal T1 and the access computer AP had already "negotiated" during connection establishment. For example, if the so-called PPP protocol was used, a data network address, e.g. an IP address, was assigned to the subscriber terminal T1 when a connection was established from the access computer. ~~Said-The~~ The data network address is now ~~taken over~~ assumed by the subscriber terminal T2. Using the information on the communication state received, the subscriber terminal T2 can also set the transmission bandwidth as well as a previously reserved quality, for example using the RSVP protocol commonly used on the Internet. Since the subscriber terminal T2 receives authorization information in the message concerning the communication state of the subscriber terminal T1, the subscriber is spared a new authorization procedure, for example through typing in passwords.

The subscriber terminal T2 furthermore automatically launches corresponding applications, e.g. an Internet browser or software for reading and processing electronic mail, and performs settings in accordance with the communication state reported to it. In the case where

the subscriber would like to read large electronic mail items, corresponding "electronic mail" software is activated on the subscriber terminal T2, i.e. the personal computer, and the desired electronic mail is immediately selected and displayed on the screen with the aid of a suitable editor. An appropriate PC application, e.g. "Word", is immediately activated for any attachments also sent. In the case of an Internet session using a browser, a corresponding browser is launched on the personal computer and the corresponding Internet page is activated, and corresponding transactions (e.g. file transfer) are performed. Once the subscriber terminal T2 has adapted itself accordingly in accordance with the reported communication state, it sends a message Completed to the subscriber terminal T1 with which it confirms that the connection establishment and appropriate adapting of its own state to the reported communication state have been successfully performed.

The subscriber terminal T1 then sends a message Release via the switching center in the direction of the access computer to terminate the still existing connection. The subscriber terminal T1 signals the connection clear-down to the subscriber terminal T2 with a message Link terminated. Following this the subscriber terminal T2 can initiate resumption of data transmission with a message Resume to the access computer. After a defined period, the existing connection between the subscriber terminal T1 and the access computer AP can be cleared, once the subscriber terminal T1 has received the message Completed.

Please replace the consecutive paragraphs beginning at line 14 of page 12 with the following rewritten paragraphs:

With the MPPP protocol, the newly established connection between the subscriber terminal T2 and the access computer AP is combined with the existing connection between the subscriber terminal T1 and the access computer AP to form a so-called "multilink bundle". At the subscriber end one channel of said the multilink bundle now terminates in the subscriber terminal T1, and the other channel in the subscriber terminal T2. To ensure unambiguous addressing of the connected subscriber terminals, the subscriber terminal T1 sends a "HandOverCompleted" message, not shown in the figure, to the subscriber terminal T2 once establishment of the new connection to the subscriber terminal T2 and adaptation of the communication state have been successfully completed. Following this, the subscriber terminal

T1 clears its existing connection and sends a message Link terminated to the subscriber terminal T2.

Figure 3 describes the method according to the invention for an analog subscriber line in which the subscriber terminals T1 and T2 are connected in parallel to the switching center VST via a so-called a/b connection. Initially there is again a connection between the subscriber terminal T1 and the access computer AP. The subscriber terminal T1 signals the switching center VST to suspend data transmission with a message Suspend, which is forwarded to the access computer AP and puts the latter into the aforesaid Hold state. The message Suspend may be transmitted, for example, by means of DMTF (Dual Tone Multifrequency) tones or MFC (Multifrequency Code). After receiving the message Suspend, the switching center suspends the data transmission between the access computer and the subscriber terminal T1 on the physical layer. In the Hold state, the access computer maintains the logical link, even if physically no data can be exchanged between the access computer and the subscriber terminal T1. ~~After all, d~~Data can then be sent between the subscriber terminals T1 and T2. While data transmission is suspended, the switching center monitors the subscriber line connected to the network termination for the arrival of a message Resume.

After suspension of data transmission, the subscriber terminal T1 sends a message Context concerning the communication state of the existing logical link to the subscriber terminal T2. ~~Said~~The message can be transmitted for example using FSK (Frequency Shift Keying). The subscriber terminal T2 adapts its own state – as already described above – to the reported communication state. If necessary, resynchronization must be performed for the subscriber-side and network-side data communication equipment, e.g. modems, participating in the data link.

In contrast to the method described for an ISDN subscriber line, the subscriber terminal T2 ~~takes over the already~~ assumes the switched connection to the access computer AP. It is therefore unnecessary to physically establish a connection or establish a new connection. By sending a message Resume to the access computer, the subscriber terminal T2 then initiates resumption of data transmission. The connection is transferred in that the subscriber terminal T2 picks up the connection and the subscriber terminal T1 hangs up. Once the described transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the access computer AP via the switching center VST.

Please replace the consecutive paragraphs beginning at line 18 of page 14 with the following rewritten paragraphs:

In the first case, a connection initially exists between the subscriber terminal T1 and the access computer AP. The subscriber terminal T1 sends a message Suspend to the access computer, whereby the latter is put in the Hold state. The subscriber terminal T1 then passes a message Context concerning the communication state to the subscriber terminal T2. Following this the subscriber terminal T2 adapts its own state to the communication state and ~~takes over the~~ already assumes the switched connection, in that it picks up the connection and the subscriber terminal T1 hangs up. A resynchronization of the subscriber-side or network-side data communication equipment, e.g. modems, may be necessary. Following this the subscriber terminal T2 transmits the message Resume to the access computer to initiate the resumption of data transmission. Once the transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the access computer AP via the switching center VST.

According to a ~~variant~~ variation of the method described above, it is possible here to omit the sending of the message Suspend, the suspension of data transmission and the Hold state of the access computer AP to maintain the logical data link. Since the subscriber terminals T1 and T2 are directly connected to one another, they can also communicate directly with one another; ~~that is to say.~~ That is, the subscriber terminal T1 need only "hang up" and the subscriber terminal T2 "picks up" once it has adapted its state to the reported communication state.

The method for transferring the existing logical data link from the subscriber terminal T2 to the subscriber terminal T1 according to the second case mentioned is analogous to the method described with reference to ~~f~~Figure 3. To transfer the data link, the subscriber terminal T1 picks up the existing connection to the access computer and the subscriber terminal T2 hangs up.

Figure 5 shows the case where the telecommunications network comprises a fixed network and a mobile network. In this case the subscriber terminal T2 of an ISDN or analog subscriber line is connected to the switching center VST, which has a connection to the access computer AP of the data network. In addition, the switching center VST, as illustrated in ~~f~~Figure 1, is connected via the telephone network and a mobile network to a radio device RBS that has a radio link to the subscriber terminal T1, e.g. a mobile station. The broken lines shown in figure 5 indicate connections between the network elements VST, AP and RBS, for example according to those illustrated in ~~f~~Figure 1.

Initially a connection exists, for example, between the subscriber terminal T1 and the access computer AP. The same signaling messages are then exchanged as described with reference to the other figures; ~~that is to say.~~ That is, the subscriber terminal T1 sends a message Suspend to the access computer AP, which puts the latter into the suspended state Hold. The subscriber terminal T1 then sends a request message Request including the communication state Context to transfer the existing logical data link to the subscriber terminal T2. Once the access computer has received the message Resume from the subscriber terminal T2, it resumes data transmission. The method described can also be used for transferring the existing data link to the access computer from the subscriber terminal T2 to the mobile station T1. The difference from the methods described in ~~f~~Figures 2 to 4 is essentially that the signaling messages, e.g. Request, are transported over the entire telecommunications network.

According to another ~~variant~~ variation of the described procedure, a laptop, for example, is connected via a serial interface to the mobile station T1 shown in ~~f~~Figure 5. The previously existing connection between the mobile station T1 and the access computer AP is thus passed on to the laptop. This method ultimately corresponds to the sequence illustrated in ~~f~~Figure 4. ~~For this,~~ ~~t~~The subscriber terminal T1 in ~~f~~Figure 4 should be thought of as a mobile station and the subscriber terminal T2 as a laptop.

It applies to ~~all~~ the methods described above that, once completed, the transferred logical data link to the subscriber terminal T2 can be transferred back to the subscriber terminal T1 again in the same way.

The method according to the invention has a further application in the case where a so-called always-on connection exists between a subscriber terminal, e.g. T1, and the access computer AP. An always-on connection means ~~here~~ a permanent narrowband data link from the subscriber terminal to the access computer AP. For ISDN subscriber lines such a narrowband connection is made available through the provision of a certain amount of bandwidth on the D-channel. With an analog subscriber line, the so-called on-hook data transmission method in accordance with the ETS 300 659-1 standard can be utilized for a permanent connection of this type.

Returning to ~~f~~Figure 2, it should be imagined that a subscriber terminal T1 has such a permanent connection to the access computer AP. The subscriber terminal, e.g. a telephone with display, receives electronic mail over this permanent connection. The subscriber would then like

to read the electronic mail on his personal computer T2 for example. The method for transferring the existing logical data link between the subscriber terminal T1 and the access computer AP then proceeds in the same way as described in ~~f~~Figure 2. To take over the existing data link, a new connection ~~must be~~ is switched between the subscriber terminal T2 and the access computer AP. Once connection establishment and adaptation of its own state to the reported communication state have been successfully completed, however, the existing permanent narrowband connection between the subscriber terminal T1 and the access computer AP is not cleared. The access computer need only be notified that all data will be sent to the subscriber terminal T2 for as long as the connection to the subscriber terminal T2 exists. On termination of the connection with the subscriber terminal T2, the data are again transmitted to the subscriber terminal T1 over the permanent connection.

In the Claims:

Please amend the claims as follows:

Claims

What is claimed is:

1. (Amended) A method for the transfer of an existing logical data link between a first subscriber terminal ~~(T1) connected~~ and a second subscriber terminal in a telecommunications network, comprising:
connecting the first subscriber terminal to a subscriber line of a the telecommunications network, and connecting a switching center ~~(VST, AP)~~ of the telecommunications network from the first subscriber terminal to a the second subscriber terminal ~~(T2) which is, the second subscriber terminal~~ connected to the subscriber line of the first subscriber terminal or to another subscriber line of the telecommunications network, ~~wherein the second subscriber terminal receives;~~
receiving a message at the second subscriber terminal sent from the first subscriber terminal and concerning providing the communication state ~~(Context) of the an~~ existing logical data link and ~~takes over~~ assuming the logical data link in the ~~reported~~ communication state, ~~adapting its own state.~~

2. (Amended) The method as claimed in claim 1, ~~characterized in that~~ wherein the telecommunications network comprises at least one fixed network (PSTN) and/or at least one mobile network (PLMN).

3. (Amended) The method as claimed in claim 1 ~~or 2~~, ~~characterized in that~~ further comprising:

exchanging messages ~~are exchanged~~ between the first subscriber terminal (T1) and the second subscriber terminal (T2), ~~which both each~~ belonging to a digital subscriber line, ~~in such a way that one of the subscriber terminals (T1, T2) sends a message addressed to the other terminal to a the network termination of the subscriber line, and the latter passes said other terminal sends the message both back in the direction of to the other subscriber terminal and forward in the direction of the to a switching center, which on receiving said message either ignores or processes it.~~

4. (Amended) The method as claimed in claim 1, ~~characterized in that~~ further comprising:

transferring the logical data link ~~is transferred~~ from a first analog subscriber terminal to a second analog subscriber terminal which is connected to the analog subscriber line of the first subscriber terminal and ~~that~~, when the logical data link is ~~taken over~~ assumed by the second subscriber terminal, the connection previously established by the first subscriber terminal between the subscriber line and the aforesaid switching center is maintained.

5. (Amended) The method as claimed in ~~one of the preceding claims~~, ~~characterized in that claim 1, wherein~~ at the latest after transmission of the message ~~concerning~~ of the communication state, a suspension (~~Suspend~~) of data transmission on the logical data link is initiated by the first subscriber terminal and ~~once~~, after the logical data link has been transferred, ~~the resumption (Resume) of data transmission is resumed and is~~ initiated by the second subscriber terminal.

6. (Amended) The method as claimed in claim 5, ~~characterized in that~~ wherein the logical link between the switching center and the subscriber terminal is maintained during the suspension phase.

7. (Amended) The method as claimed in ~~one of the preceding claims, characterized in that~~ claim 1, wherein the message ~~concerning about~~ the communication state ~~contains the~~ includes an assigned data network address of at least one of the first subscriber terminal, ~~and/or~~ information about the transmission bandwidth, ~~and/or~~ information about a reserved quality, ~~and/or~~ authorization information, ~~and/or~~ application settings information, ~~and/or~~ information about the a state of the applications activated in the first subscriber terminal and synchronization information for one or more data communication devices present in the subscriber terminal.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

SYSTEM AND METHOD FOR THE TRANSFER OF AN EXISTING LOGICAL DATA LINK

Abstract

An existing logical data link between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network is transferred from a first subscriber terminal to a second subscriber terminal which is connected to the subscriber line of the first subscriber terminal or to another subscriber line of the second telecommunications network. The second subscriber terminal receives a message sent from the first subscriber terminal concerning the communication state of the existing logical data link and takes over this data link in the reported communication state, adapting its own state.

1994-09-27 10:00:00

5/pvls

Description

Method for the transfer of an existing logical data link

5

The invention relates to a method for the transfer of an existing logical data link. The logical data link exists between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching center of the telecommunications network.

10

A telecommunications network of this type is illustrated by way of example in figure 1. In it the telecommunications network is connected to an access computer AP of a data network DN, e.g. the Internet. Various subscriber terminals, e.g. a personal computer PC, a corded telephone TF and a cordless handset SL with its base station BS, are connected to a switching center VST. Said switching center has a connection to the aforesaid access computer AP of the data network DN via a circuit-switched public telephone network PSTN or via a packet-switched data network PN, e.g. X.25. At the same time the public telephone network is connected to a mobile communications network PLMN which encompasses a plurality of radio devices RBS for connecting a plurality of subscriber terminals via a radio interface. Such subscriber terminals are, for example, mobile stations MS; it is also possible for a laptop LT or a personal computer to be connected to one of the indicated mobile stations via a serial interface, or for a mobile station to be integrated in a laptop or personal computer.

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Given a network constellation of this type, the situation is currently as follows:

A subscriber of the telecommunications network has various subscriber terminals, for example as illustrated in figure 1, which all enable access to a data network, e.g. the Internet. Accordingly, with his
5 subscriber terminal with display screen, e.g. TF, the subscriber can receive, read and process electronic mail (email) from the data network. It is assumed that the subscriber has established a data link to the data network with such a subscriber terminal in order to
10 send his electronic mail from a so-called mail server, not shown in figure 1, of the data network to his subscriber terminal. However large items of electronic mail received which contain, for example, so-called attachments in the format of PC applications (e.g.
15 Word) cannot be displayed on the subscriber terminal, e.g. TF, because of the relatively small display and the low memory capacity. The subscriber therefore would like to use his personal computer to read such electronic mail. For this, the subscriber must either
20 establish a further data link (e.g. by using the second B-channel in the case of an ISDN connection) or a new data link to the access computer of the data network, must obtain authorization again, by typing in a password for example, must activate the respective PC
25 application for reading electronic mail on his PC, and finally must select the aforesaid electronic mail with attachment for displaying on the screen of the personal computer. If the subscriber then switches off the personal computer again and would like to continue
30 processing further electronic mail on his telephone with display, he must repeat the procedure set out above.

Also in the case of Internet applications other than electronic mail, such as the accessing of provider
35 pages with the aid of a so-called browser for example, the subscriber must proceed in a similar manner to reach the same state on his personal computer as was previously present on his telephone, that is to say for

example the same provider page accessed, the same state of transactions already made, such as a file transfer for example, the same bookmarks etc.

5 A procedure of this type is disadvantageous for a number of reasons:

- The establishment of a further or a new data link requires renewed authorization of the user, for example by entering passwords, and the selection of the access computer to be dialed.
- 10 - The renewed connection establishment is in itself time-consuming since it is necessary to assign a new data network address (IP address) to the subscriber terminal (the personal computer in the example) for an Internet session, for which the
- 15 so-called PPP (point-to-point) protocol is preferably used. Moreover, the communication partners of the data link must again agree transmission parameters, such as transmission bandwidth and quality for example, and must also
- 20 exchange authorization data again.

The object of the invention is to develop a method that solves the problems specified.

This object is achieved by the means specified in claim 1. Further refinements of the invention are

25 characterized in subclaims.

The basis of the invention is a method for the transfer of an existing logical data link between a first subscriber terminal connected to a subscriber line of a telecommunications network and a switching

30 center of the telecommunications network from the first subscriber terminal to a second subscriber terminal which is connected to the subscriber line of the first subscriber terminal or to another subscriber line of

the telecommunications network. The first subscriber terminal sends a message concerning the communication state of the existing logical data link to the second subscriber terminal and takes over the data link in the reported communication state, adapting its own state. The communication state refers to all agreements between the communication partners of the logical data link that have already been "negotiated" during connection establishment or in the course of the data link. The communication state also refers to states relating to activated applications and device settings of the first subscriber terminal.

The message concerning the communication state can contain in particular: the assigned data network address of the first subscriber terminal and/or information about the transmission bandwidth and/or information about a reserved quality and/or authorization information and/or application settings information and/or information about the state of the applications activated in the first subscriber terminal and/or synchronization information for one or more data communication devices present in the subscriber terminal. The second subscriber terminal adapts its own state to the communication state. It thus takes the place of the first subscriber terminal. In addition, it sets its applications in accordance with the application settings of the first subscriber terminal, such as address books or bookmarks on Internet pages for example, and at the same time activates the applications that correspond to the applications of the first subscriber terminal. If, for example, an Internet browser or a word processing program is activated on the first subscriber terminal, then an Internet browser or a corresponding word processing program, e.g. Word,

is therefore likewise launched on the second subscriber terminal.

In particular in connection with the situation illustrated at the outset, in which a subscriber has a first subscriber terminal, in the form of a telephone with display for example, and a second subscriber terminal, e.g. a PC, on his subscriber line, the method according to the invention represents a particularly favorable solution. For reading large items of electronic mail the subscriber can transfer the logical data link to his personal computer. The respective electronic mail which the subscriber had previously selected on the telephone is immediately displayed on the screen of the personal computer using a corresponding application. No interactions are required on the part of the subscriber. Transmission properties of the data link, such as transmission bandwidth or a reserved quality for example, are also retained. Settings in applications in the second subscriber terminal, such as address books for example, are also synchronized with those of the first subscriber terminal. The same advantages are conferred if the subscriber wishes to transfer back the transferred logical data link from the second subscriber terminal to the first subscriber terminal again.

The method according to the invention can likewise be advantageously applied to the case where the first subscriber terminal and the second subscriber terminal are connected to different subscriber lines; that is to say if, for example, the aforesaid telephone of the subscriber is installed in the house and the personal computer is installed in the office of the subscriber. It is therefore possible to transfer an existing logical data link between the subscriber terminal at home and the access computer of the data network to the personal computer of a trusted colleague in the office.

One refinement of the invention relates to the aforesaid telecommunications network, which comprises at least one fixed network and/or at least one mobile network. Accordingly, a logical data link that exists
5 between a mobile station of the mobile network and the data network can be transferred to a second subscriber terminal, e.g. a personal computer, which is connected to a subscriber line of the fixed network, and vice versa. A personal computer can also be connected
10 directly to the mobile station and can take over the existing data link. The method according to the invention can therefore be used on different types of network.

A further refinement of the invention relates
15 to message exchange between the first subscriber terminal and the second subscriber terminal, which both belong to a digital, preferably an ISDN, subscriber line. Messages are exchanged in such a way that one of the subscriber terminals (T1,T2) sends a message
20 addressed to the other terminal to the network termination of the subscriber line, and the latter passes said message both back in the direction of the other subscriber terminal and forward in the direction of the switching center, which on receiving said
25 message either ignores or processes it. For this purpose the signaling protocol need only be modified slightly so that the switching center can ignore or evaluate the message received.

One further development of the invention
30 envisages that the logical data link is transferred from a first analog subscriber terminal to a second analog subscriber terminal which is connected to the analog subscriber line of the first subscriber terminal, and when the logical data link is taken over
35 the connection previously established by the first subscriber terminal between the subscriber line and the aforesaid switching center of the telecommunications network is maintained. By dispensing with a new

establishment of a connection between the subscriber line and the switching center which is necessary for transferring the existing logical data link, above all resources in the network and time are saved, and
5 repeated interactions of the subscriber, for example through repeated typing in of his password, are avoided.

A further advantageous refinement of the invention consists in that, at the latest after
10 transmission of the message concerning the communication state, a suspension of data transmission on the data link is initiated by the first subscriber terminal and once the logical data link has been taken over the resumption of data transmission is initiated
15 by the second subscriber terminal. This minimizes the loss of data which would normally lead to a repeated transmission of the lost data, resulting in reduced transmission bandwidth.

To avoid new establishment of the connection
20 between the switching center and the subscriber line, according to a further development of the invention the logical link is maintained during the aforesaid suspension phase.

An exemplary embodiment of the invention is
25 explained below in greater detail with reference to a drawing, in which:

Figure 1 shows the network constellation mentioned at the outset to which the method according to the invention can be applied;
30 Figure 2 shows a flow diagram of the method according to the invention in which two subscriber terminals are connected to the S0 bus of an ISDN subscriber line;
Figure 3 shows a flow diagram of the method according to the invention in which the subscriber terminals are
35 connected in parallel to an a/b line of an analog

subscriber line;

Figure 4 shows a flow diagram in which the subscriber terminals are connected in series to an a/b line of an analog subscriber line; and

- 5 Figure 5 shows a flow diagram in which the first subscriber terminal represents a mobile station of the mobile network and the second subscriber terminal belongs to an ISDN or analog subscriber line of the fixed network.

10 Figure 2 represents an ISDN subscriber line in which the subscriber terminals, e.g. T1 and T2, are connected in parallel to a so-called S0 bus which terminates at the network termination NT schematically indicated in the figure. From the network termination
15 NT, a subscriber line leads to the switching center VST of the public telephone network. The switching center has a connection to an access computer AP of a data network. Said connection may be of various different types and is therefore indicated by a broken line in
20 figure 2. For example, as described in figure 1, the connection may be established to the access computer AP via the public telephone network PSTN or via the No. 7 signaling network of the public telephone network, or via a packet-switched network, e.g. X.25. The access
25 computer AP may also be integrated in the switching center VST. Various types of terminals are possible as subscriber terminals T1 and T2, e.g. a personal computer, a corded telephone with a display, or also a base station with a radio link to a cordless telephone.

30 In the example a subscriber has established a connection to the access computer of the data network with his subscriber terminal T1, e.g. a telephone with display. After retrieving his new electronic mail that has arrived at a mail server, he would like to read it

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and he notices that some electronic mail messages are very large. He would like to transfer this logical data link to his personal computer, e.g. T2. For this he presses a key on his telephone for example. The subscriber terminal T1, i.e. the telephone, then sends a request message Request for transferring the logical data link including its communication state Context to the subscriber terminal T2.

The message can be transmitted using ISDN signaling. The signaling message, i.e. the request message Request, is sent to the network termination NT, which represents the interface to the S0 bus. The message is then both sent back to the subscriber terminal T2 and forwarded to the switching center VST. The switching center can either accept this message as a so-called suspend message Suspend or simply ignore it. Said message Suspend can, as shown in the figure, be forwarded by the switching center to the access computer AP in order to signal the access computer to suspend data transmission on the logical data link but continue to maintain the data link. This suspended state of the access computer is indicated in figure 2 by Hold.

After receiving the request message Request including the communication state Context, the subscriber terminal T2 sends a confirmation message Confirm back to the subscriber terminal T1 in the manner described above.

Finally the subscriber terminal T2 establishes a new connection, indicated by "Connection" in figure 2, to the access computer. In doing so, in accordance with the communication state received, the

subscriber terminal T2 sets the same device state as the subscriber terminal T1 had prior to transmission of the request message, and also the same connection state with respect to the data link that the connection between the subscriber terminal T1 and the access computer had prior to transmission of the request message. In other words, the subscriber terminal T2 must take over the agreements that the subscriber terminal T1 and the access computer AP had already "negotiated" during connection establishment. For example, if the so-called PPP protocol was used, a data network address, e.g. an IP address, was assigned to the subscriber terminal T1 when a connection was established from the access computer. Said data network address is now taken over by the subscriber terminal T2. Using the information on the communication state received, the subscriber terminal T2 can also set the transmission bandwidth as well as a previously reserved quality, for example using the RSVP protocol commonly used on the Internet. Since the subscriber terminal T2 receives authorization information in the message concerning the communication state of the subscriber terminal T1, the subscriber is spared a new authorization procedure, for example through typing in passwords.

The subscriber terminal T2 furthermore automatically launches corresponding applications, e.g. an Internet browser or software for reading and processing electronic mail, and performs settings in accordance with the communication state reported to it. In the case where the subscriber would like to read large electronic mail items, corresponding "electronic mail" software is activated on the subscriber terminal T2, i.e. the personal computer, and the desired electronic mail is immediately selected and displayed on the screen with the aid of a suitable editor. An appropriate PC application, e.g. "Word", is immediately activated for any attachments

also sent. In the case of an Internet session using a browser, a corresponding browser is launched on the personal computer and the corresponding Internet page is activated, and corresponding transactions (e.g. file transfer) are performed. Once the subscriber terminal T2 has adapted itself accordingly in accordance with the reported communication state, it sends a message Completed to the subscriber terminal T1 with which it confirms that the connection establishment and appropriate adapting of its own state to the reported communication state have been successfully performed.

The subscriber terminal T1 then sends a message Release via the switching center in the direction of the access computer to terminate the still existing connection. The subscriber terminal T1 signals the connection cleardown to the subscriber terminal T2 with a message Link terminated. Following this the subscriber terminal T2 can initiate resumption of data transmission with a message Resume to the access computer. After a defined period, the existing connection between the subscriber terminal T1 and the access computer AP can be cleared, once the subscriber terminal T1 has received the message Completed.

In the case where, after transmission of the transfer request and its confirmation, both B-channels of the ISDN subscriber line are occupied, the existing connection can initially be terminated, as described above, with the messages Release, Link terminated and Resume, and then a new connection can be established between the subscriber terminal T2 and the access computer. The communication state of the new connection and the subscriber terminal T2 is then adapted in accordance with the above description.

The following procedure, not represented in the figure, can be seen as an alternative to the method described above: the transfer of the logical data link is signaled by specific messages of higher protocol layers, e.g. PPP or MPPP (multi-point-to-point protocol). With the PPP protocol the subscriber terminal T2 is notified of a unique connection identifier previously agreed between the subscriber terminal T1 and the access computer AP in a message of the protocol concerning the communication state. The subscriber terminal then adapts its state to the reported state and takes over the connection indicated by the connection identifier.

With the MPPP protocol, the newly established connection between the subscriber terminal T2 and the access computer AP is combined with the existing connection between the subscriber terminal T1 and the access computer AP to form a so-called "multilink bundle". At the subscriber end one channel of said multilink bundle now terminates in the subscriber terminal T1, and the other channel in the subscriber terminal T2. To ensure unambiguous addressing of the connected subscriber terminals, the subscriber terminal T1 sends a "HandOverCompleted" message, not shown in the figure, to the subscriber terminal T2 once establishment of the new connection to the subscriber terminal T2 and adaptation of the communication state have been successfully completed. Following this, the subscriber terminal T1 clears its existing connection and sends a message Link terminated to the subscriber terminal T2.

Figure 3 describes the method according to the invention for an analog subscriber line in which the subscriber terminals T1 and T2 are connected in parallel to the switching center VST via a so-called a/b connection. Initially there is again a connection between the subscriber terminal T1 and the access

computer AP. The subscriber terminal T1 signals the switching center VST to suspend data transmission with a message Suspend, which is forwarded to the access computer AP and puts the latter into the aforesaid Hold state. The message Suspend may be transmitted, for example, by means of DMTF (Dual Tone Multifrequency) tones or MFC (Multifrequency Code). After receiving the message Suspend, the switching center suspends the data transmission between the access computer and the subscriber terminal T1 on the physical layer. In the Hold state, the access computer maintains the logical link, even if physically no data can be exchanged between the access computer and the subscriber terminal T1. After all, data can then be sent between the subscriber terminals T1 and T2. While data transmission is suspended, the switching center monitors the subscriber line connected to the network termination for the arrival of a message Resume.

After suspension of data transmission, the subscriber terminal T1 sends a message Context concerning the communication state of the existing logical link to the subscriber terminal T2. Said message can be transmitted for example using FSK (Frequency Shift Keying). The subscriber terminal T2 adapts its own state - as already described above - to the reported communication state. If necessary, resynchronization must be performed for the subscriber-side and network-side data communication equipment, e.g. modems, participating in the data link.

In contrast to the method described for an ISDN subscriber line, the subscriber terminal T2 takes over the already switched connection to the access computer AP. It is therefore unnecessary to physically establish a connection or establish a new connection. By sending

a message Resume to the access computer, the subscriber terminal T2 then initiates resumption of data transmission. The connection is transferred in that the subscriber terminal T2 picks up the connection and the subscriber terminal T1 hangs up. Once the described transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the access computer AP via the switching center VST.

Figure 4 shows an analog subscriber line in which the subscriber terminals T2 and T1 are connected in series. Accordingly, a distinction must be drawn between two cases:

In the first case the subscriber terminal T1 transfers the existing logical data link to the subscriber terminal T2. In the second case the subscriber terminal T2 transfers the existing logical data link to the subscriber terminal T1.

In the first case, a connection initially exists between the subscriber terminal T1 and the access computer AP. The subscriber terminal T1 sends a message Suspend to the access computer, whereby the latter is put in the Hold state. The subscriber terminal T1 then passes a message Context concerning the communication state to the subscriber terminal T2.

Following this the subscriber terminal T2 adapts its own state to the communication state and takes over the already switched connection, in that it picks up the connection and the subscriber terminal T1 hangs up. A resynchronization of the subscriber-side or network-side data communication equipment, e.g. modems, may be necessary. Following this the subscriber terminal T2 transmits the message Resume to the access computer to initiate the resumption of data transmission. Once the transfer procedure has been completed, a connection exists between the subscriber terminal T2 and the

access computer AP via the switching center VST.

According to a variant of the method described above, it is possible here to omit the sending of the message Suspend, the suspension of data transmission and the Hold state of the access computer AP to maintain the logical data link. Since the subscriber terminals T1 and T2 are directly connected to one another, they can also communicate directly with one another; that is to say the subscriber terminal T1 need only "hang up" and the subscriber terminal T2 "picks up" once it has adapted its state to the reported communication state.

The method for transferring the existing logical data link from the subscriber terminal T2 to the subscriber terminal T1 according to the second case mentioned is analogous to the method described with reference to figure 3. To transfer the data link, the subscriber terminal T1 picks up the existing connection to the access computer and the subscriber terminal T2 hangs up.

Figure 5 shows the case where the telecommunications network comprises a fixed network and a mobile network. In this case the subscriber terminal T2 of an ISDN or analog subscriber line is connected to the switching center VST, which has a connection to the access computer AP of the data network. In addition, the switching center VST, as illustrated in figure 1, is connected via the telephone network and a mobile network to a radio device RBS that has a radio link to the subscriber terminal T1, e.g. a mobile station. The broken lines shown in figure 5 indicate connections between the network elements VST, AP and RBS, for example according to those illustrated in figure 1.

Initially a connection exists, for example, between the subscriber terminal T1 and the access computer AP. The same signaling messages are then exchanged as described with reference to the other figures; that is to say the subscriber terminal T1 sends a message Suspend to the access computer AP, which puts the latter into the suspended state Hold. The subscriber terminal T1 then sends a request message Request including the communication state Context to transfer the existing logical data link to the subscriber terminal T2. Once the access computer has received the message Resume from the subscriber terminal T2, it resumes data transmission. The method described can also be used for transferring the existing data link to the access computer from the subscriber terminal T2 to the mobile station T1. The difference from the methods described in figures 2 to 4 is essentially that the signaling messages, e.g. Request, are transported over the entire telecommunications network.

According to another variant of the described procedure, a laptop, for example, is connected via a serial interface to the mobile station T1 shown in figure 5. The previously existing connection between the mobile station T1 and the access computer AP is thus passed on to the laptop. This method ultimately corresponds to the sequence illustrated in figure 4. For this, the subscriber terminal T1 in figure 4 should be thought of as a mobile station and the subscriber terminal T2 as a laptop.

It applies to all the methods described above that, once completed, the transferred logical data link to the subscriber terminal T2 can be transferred back to the subscriber terminal T1 again in the same way.

The method according to the invention has a further application in the case where a so-called

always-on connection exists between a subscriber terminal, e.g. T1, and the access computer AP. An always-on connection means here a permanent narrowband data link from the subscriber terminal to the access computer AP. For ISDN subscriber lines such a narrowband connection is made available through the provision of a certain amount of bandwidth on the D-channel. With an analog subscriber line, the so-called on-hook data transmission method in accordance with the ETS 300 659-1 standard can be utilized for a permanent connection of this type.

Returning to figure 2, it should be imagined that a subscriber terminal T1 has such a permanent connection to the access computer AP. The subscriber terminal, e.g. a telephone with display, receives electronic mail over this permanent connection. The subscriber would then like to read the electronic mail on his personal computer T2 for example. The method for transferring the existing logical data link between the subscriber terminal T1 and the access computer AP then proceeds in the same way as described in figure 2. To take over the existing data link, a new connection must be switched between the subscriber terminal T2 and the access computer AP. Once connection establishment and adaptation of its own state to the reported communication state have been successfully completed, however, the existing permanent narrowband connection between the subscriber terminal T1 and the access computer AP is not cleared. The access computer need only be notified that all data will be sent to the subscriber terminal T2 for as long as the connection to the subscriber terminal T2 exists. On termination of the connection with the subscriber terminal T2, the data are again transmitted to the subscriber terminal T1 over the permanent connection.

Claims

1. A method for the transfer of an existing logical data link between a first subscriber terminal
5 (T1) connected to a subscriber line of a telecommunications network and a switching center (VST, AP) of the telecommunications network from the first subscriber terminal to a second subscriber terminal (T2) which is connected to the subscriber line of the
10 first subscriber terminal or to another subscriber line of the telecommunications network, wherein the second subscriber terminal receives a message sent from the first subscriber terminal concerning the communication state (Context) of the existing logical data link and
15 takes over the data link in the reported communication state, adapting its own state.
2. The method as claimed in claim 1, characterized in that the telecommunications network comprises at least one fixed network (PSTN) and/or at least one
20 mobile network (PLMN).
3. The method as claimed in claim 1 or 2, characterized in that messages are exchanged between the first subscriber terminal (T1) and the second subscriber terminal (T2), which both belong to a
25 digital subscriber line, in such a way that one of the subscriber terminals (T1,T2) sends a message addressed to the other terminal to the network termination of the subscriber line, and the latter passes said message both back in the direction of the other subscriber
30 terminal and forward in the direction of the switching center, which on receiving said message either ignores or processes it.
4. The method as claimed in claim 1, characterized in that the logical data link is transferred from a
35 first analog subscriber terminal to a second analog subscriber terminal which is connected to the analog

subscriber line of the first subscriber terminal and that, when the logical data link is taken over by the second subscriber terminal, the connection previously established by the first subscriber terminal between
5 the subscriber line and the aforesaid switching center is maintained.

5. The method as claimed in one of the preceding claims, characterized in that at the latest after transmission of the message concerning the
10 communication state, a suspension (Suspend) of data transmission on the data link is initiated by the first subscriber terminal and once the logical data link has been transferred the resumption (Resume) of data transmission is initiated by the second subscriber
15 terminal.

6. The method as claimed in claim 5, characterized in that the logical link between the switching center and the subscriber terminal is maintained during the suspension phase.

20 7. The method as claimed in one of the preceding claims, characterized in that the message concerning the communication state contains the assigned data network address of the first subscriber terminal and/or information about the transmission bandwidth and/or
25 information about a reserved quality and/or authorization information and/or application settings information and/or information about the state of the applications activated in the first subscriber terminal and/or synchronization information for one or more data
30 communication devices present in the subscriber terminal.

Abstract

Method for the transfer of an existing logical data link

An existing logical data link between a first subscriber terminal (T1) connected to a subscriber line of a telecommunications network and a switching center (VST, AP) of the telecommunications network is transferred from a first subscriber terminal (T1) to a second subscriber terminal (T2) which is connected to the subscriber line of the first subscriber terminal or to another subscriber line of the second telecommunications network. The second subscriber terminal receives a message sent from the first subscriber terminal concerning the communication state (Context) of the existing logical data link and takes over this data link in the reported communication state, adapting its own state.

figure 2

10049273-02402

FIG 1

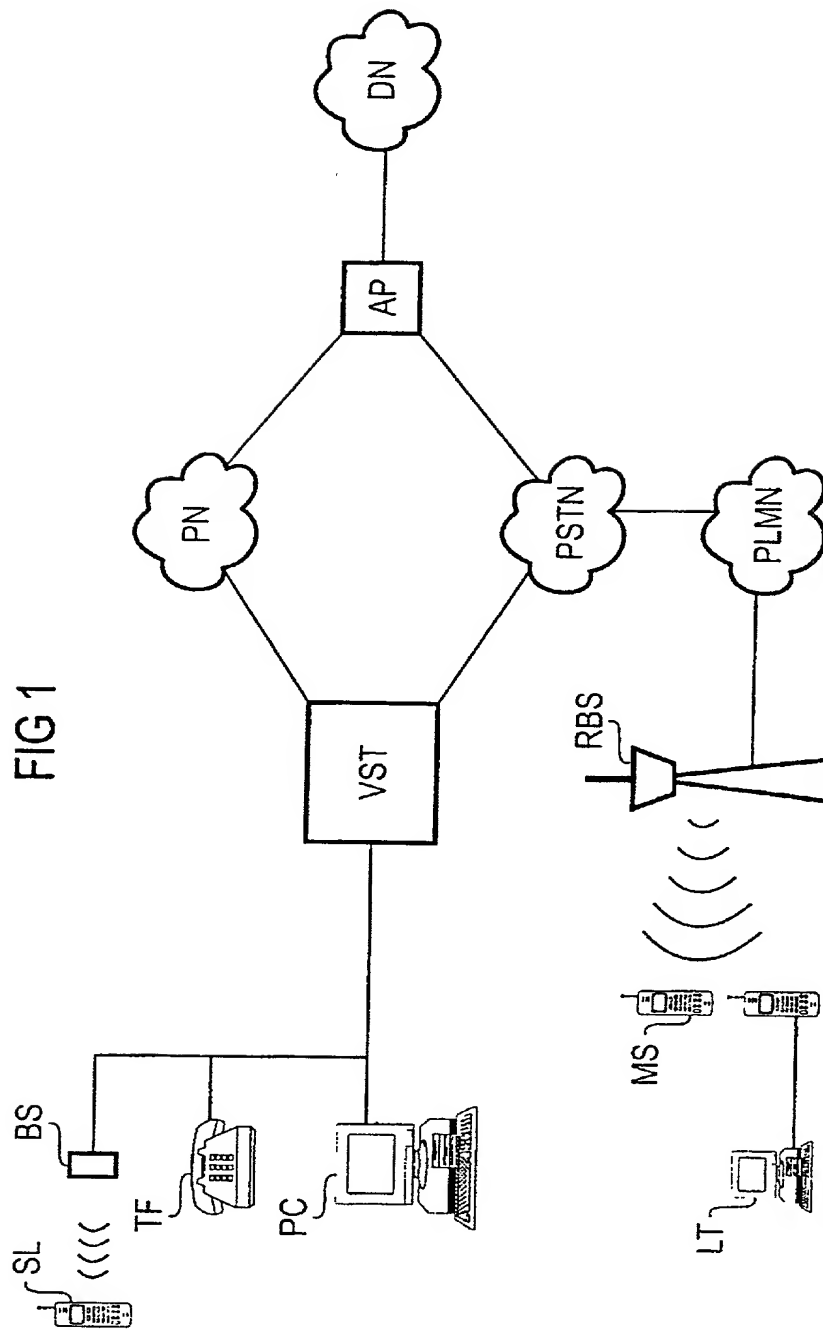


FIG 2

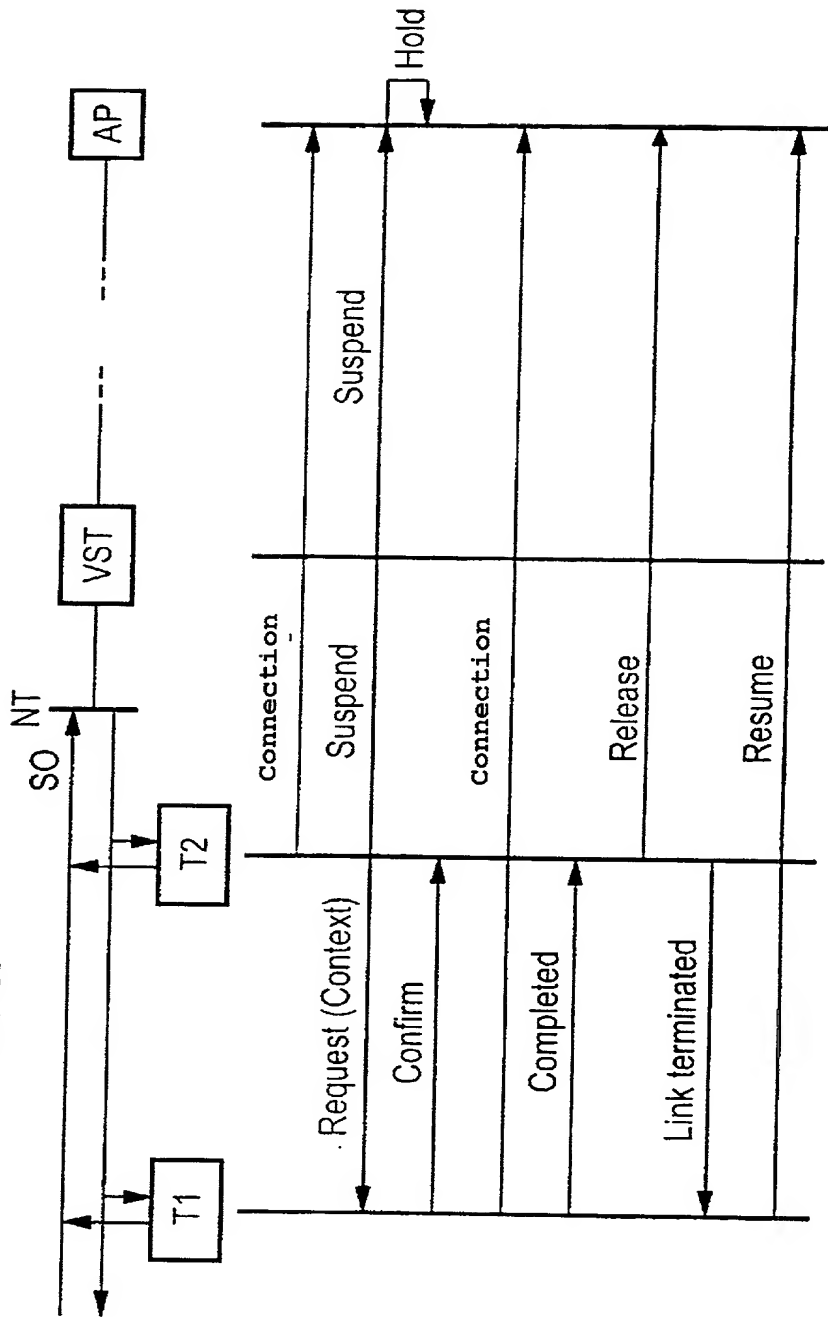


FIG 3

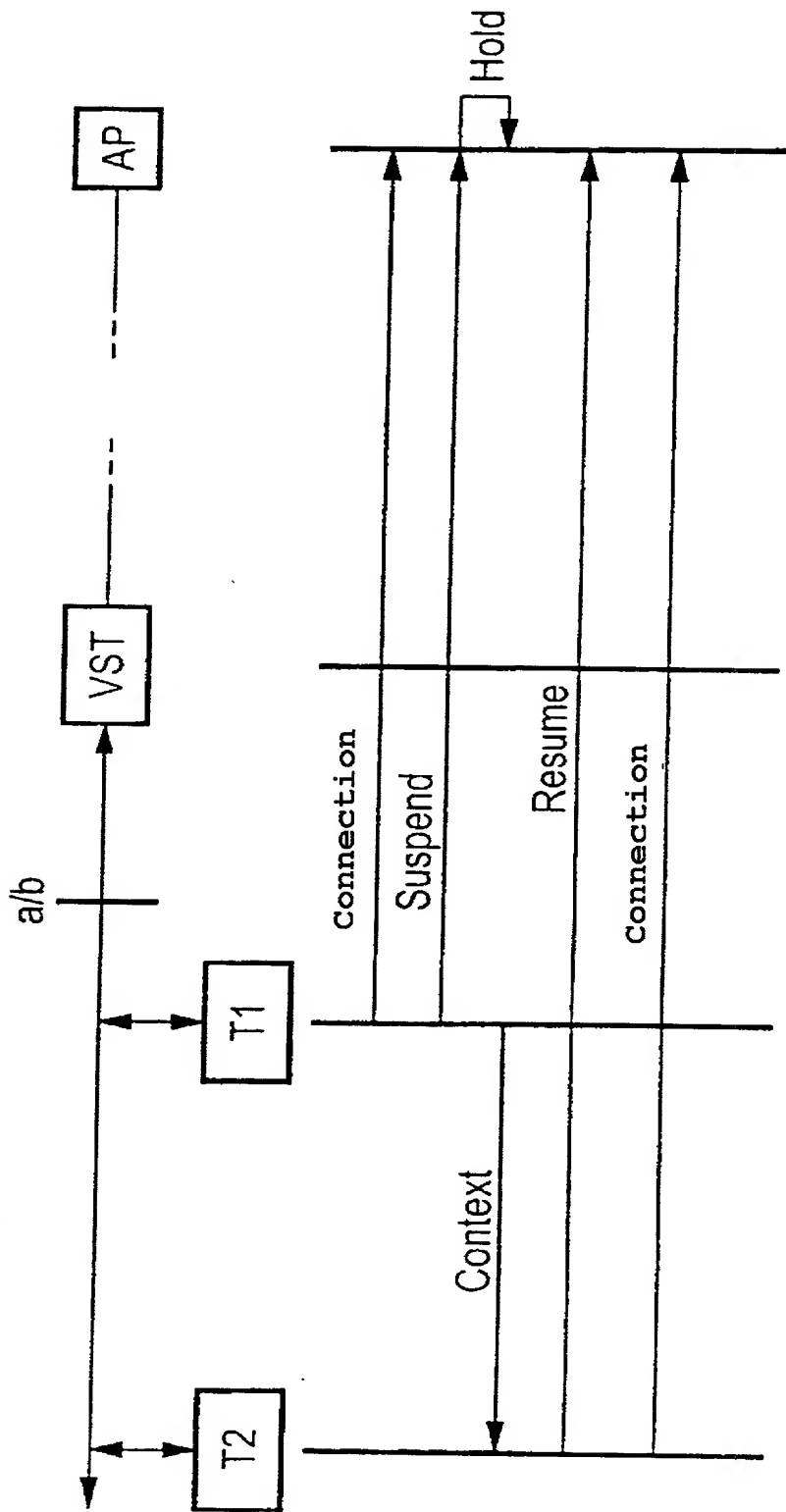
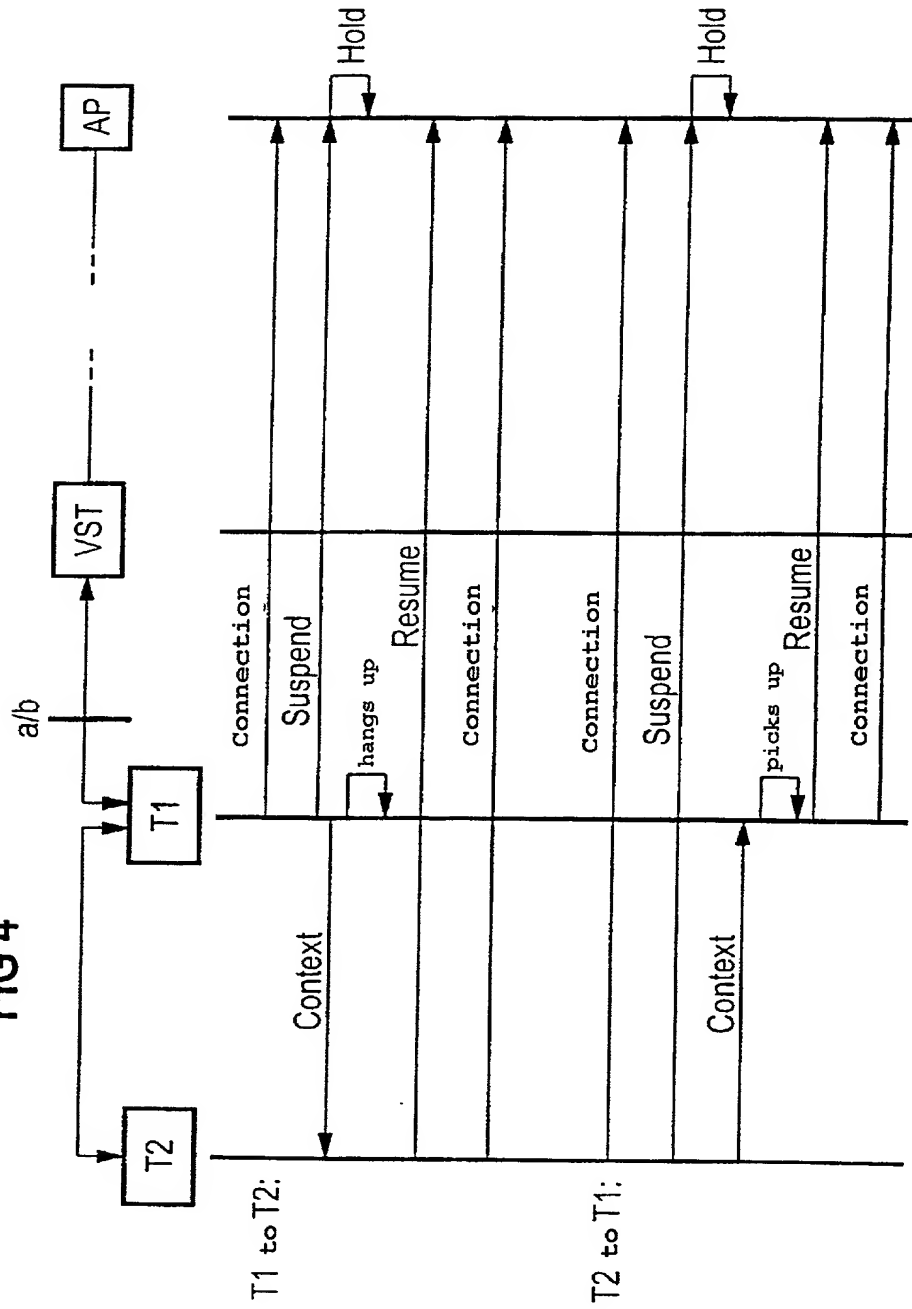
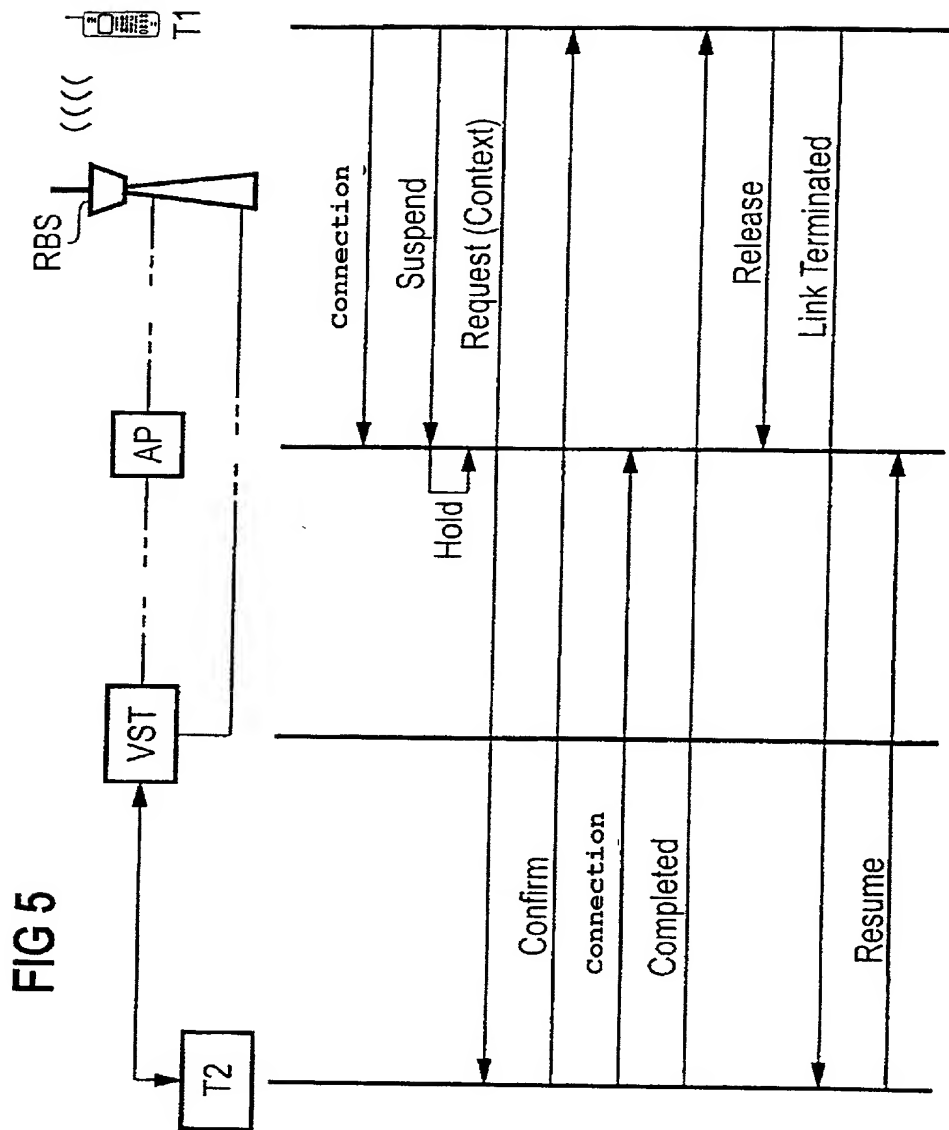


FIG 4





Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren zur Übergabe einer bestehenden logischen Datenverbindung

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigelegt ist.

☒ am 04.08.2000 als

PCT internationale Anmeldung

PCT Anwendungsnummer PCT/DE00/02611

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Method for the transfer of an existing logical data link

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 04.08.2000 as

PCT international application

PCT Application No. PCT/DE00/02611

and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

19937710.3
(Number)
(Nummer)

DE
(Country)
(Land)

10.08.1999
(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

(Number)
(Nummer)

(Country)
(Land)

(Day Month Year Filed)
(Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/02611
(Application Serial No.)
(Anmeldeseriennummer)

04.08.2000
(Filing Date D, M, Y)
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anhängig
(Status)
(patentiert, anhängig,
aufgegeben)

pending
(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M, J)

(Status)
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aufgeben)

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(patented, pending,
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Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

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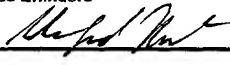
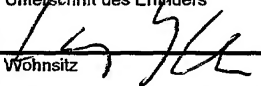
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